

REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.111, and in light of the remarks which follow, are respectfully requested.

By the present amendment, Applicants have presented a new Abstract in accordance with the Examiner's suggestion.

Claims 1 and 6 have been amended in response to issues raised in the Office Action. Claims 1-14 remain pending in this application.

The Abstract and the drawings were objected to for the reasons set forth in paragraphs (2) and (3), respectively, of the Official Action. Withdrawal of these rejections is respectfully requested in view of the submission of a new Abstract and clean copies of Figures 3-4 of the drawings.

Claims 1 and 6 were objected to for the reasons discussed in paragraph (4) of the Office Action. Withdrawal of this rejection is respectfully requested in view of the above amendments and the following remarks.

Claim 1 has been amended to replace "including" with "comprising". Claim 6 has been amended to insert --said-- after "wherein".

In view of the above, the objection to claims 1 and 6 has been obviated and should be withdrawn.

Claims 1-5 and 8-12 were rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,191,323 (Nemeth et al) for the reasons set forth in paragraph (6) of the Office Action. Claims 1-4, 6-11, 13 and 14 were rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,413,902 (Pinnavaia et al) for the reasons given in paragraph (7) of the

Official Action. Reconsideration and withdrawal of these rejections are requested for at least the following reasons.

The Office Action refers to Examples 3 and 5 of Nemeth et al '323 as allegedly disclosing "the invention substantially as claimed." Respectfully, Applicants disagree.

Present claim 1 includes the steps of initially admixing an alcohol, a titanium alkoxide and a binder in the presence of a catalytic acid to form a mixture which is heated and then calcined. On the other hand, the method disclosed in Examples 3 and 5 of the reference involves admixing a titanium alkoxide with tetraethylorthosilicate, tetraethylammonium hydroxide and hydrogen peroxide and stirring until the ethanol by-product was evaporated. This admixture (without the evaporated ethanol) is then heated at 140°C for several days. Clearly, the method of Nemeth et al '323 does not include the claimed steps of mixing an alcohol with alkoxide, binder and acid to form a first mixture and heating the aforesaid alcohol-containing mixture to at least 100°C.

Applicant notes further that a binder is never identified as such in Examples 3 and 5 of the reference nor does Nemeth et al '323 disclose any of the ratios set forth in claim 5.

Further, the addition of alcohols in the first step of forming the mixture provides a well-defined crystal phase of the catalyst, and provides a Brunauer-Emmett-Teller (BET) surface area in the catalyst. A high BET surface allows the photo-oxidation of pollutants to occur even at low concentration at sub parts per billion levels. This is an unexpected result of having an alcohol present in the initial mixture and is not suggested in the cited art.

Applicants also note that the catalyst of Nemeth et al '323 is used for organic reduction while the catalyst of the present invention is used for photo-oxidation of pollutants in the form of both organic and inorganic compounds. As is generally known in the art, reduction and oxidation are two completely opposite processes and, therefore, one skilled in

the art would not be motivated to modify the teachings in Nemeth et al '323 to arrive at the present invention. Structurally, the respective catalysts of the present invention and those of the reference are completely different.

With regard to Pinnavaia et al '902, Applicants note that the Examiner cites column 17, line 53 to column 18, line 11, to support the allegation that Pinnavaia et al '902 discloses most of the features recited in claims 1-4, 6-11, 13 and 14. Applicants disagree that this document "discloses the invention substantially as claimed."

In Example 10 of Pinnavaia et al '902, the initial mixture contained tetraethyl orthosilicate (TEOS), ethanol, tetraisopropyl orthotitanate (TIPOT) and isopropyl alcohol. This mixture was then heated at 65°-80 °C. Thus, this first mixture does not appear to contain water as an adjunct to TEOS (note claim 4) nor a catalytic acid as specified in present claim 1.

The Office Action suggests that water normally would be present in the tetraorthosilicate solution. The presence of water as a solvent in the initial mixture is not disclosed. The solvent appears to be ETOH.

The process of Pinnavaia et al '902 yields a mesoporous molecular sieve. Applicants' claims are directed to a different process which yields a completely different product, namely, a photocatalyst which acts to oxidize pollutants present in very low concentrations. It would not have been obvious to modify the process of this document which produces molecular sieves in order to arrive at Applicants' claimed invention.

Claims 2-7 also are inventive over Nemeth et al '323 and Pinnavaia et al '902 as the identities of the various components, including the alcohols, titanium alkoxides, binder and the catalytic acid, and their respective amounts to be used in the methods of this invention,

have been determined by numerous trials to ensure excellent performance of the catalyst resulting from the methods of the present invention.

In view of the above, the §103 rejections over Nemeth et al '323 or Pinnavaia et al '902 should be reconsidered and withdrawn. Such action is earnestly solicited.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (703) 838-6683 at his earliest convenience.

Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS:

In response to the Examiner's objection to the drawings, Applicants submit herewith, as a separate filing, one (1) sheet of replacement drawings for Figures 3 and 4. Should the enclosed drawings require changes, it is respectfully requested that the U.S. Patent and Trademark Office notify the undersigned.